Redditnet Guide to Extreme EmComm

I am sharing my observations based on my experience with remote emergency communications. This is only a guide. I would like community support to make this guide better. Collectively we can come up with great ideas. There are things I don't know and that is okay. Together we can make this a concise and efficient guide to help us prepare for the next time we are called for help. My ideas are based on my experience as a first responder, firefighter, EMT, combat medic, soldier, Boy Scout, and Extra Class Amateur Radio Operator. The ideas of others are based on their unique life experience and knowledge. Nothing in this guide is designed to replace any official manual or local laws. This is a community effort that is meant to be used worldwide for emergency communications.

"Be Prepared"

Preparation

You never know when someone might call you to help. You need to practice and be proficient in your skills. If you love digital modes you might want to stop and pick up the microphone from time to time. If you love talking on the mic you really should learn how to use some digital modes. If you know both, now is the time to learn morse code. You will want as many tools at your disposal as possible.

Learn to use your equipment to its full potential. In emergency situations equipment may fail unexpectedly, for this reason you should know how to operate each piece of equipment independently. For example; radio programming software is very useful, and great to have in an emergency, but if your computer fails it may be necessary to program your radio manually. Be aware which of your tools are dependent on each other, and work to reduce that dependency.

Radio Packing list:
HF/VHF Transceiver
Power Supply
Antenna Tuner
Multiband Antenna
VHF Antenna
Handheld Radio
200+ feet of paracord or dacron
50 feet of extension cord
2 50 foot sections of coax
1 shorter section of coax for VHF antenna
Adapters and barrel connectors
Electrical Tape
Multimeter
Batteries
The user manuals for each device you brought.

Additional Helpful Supplies:
Headphones and ¼ to ⅛ inch adapter
Slingshot
Large nuts for slingshot
Leatherman or Multi-tool (with screwdriver and pliers)
Pocketknife

Ink pens / Mechanical Pencils
Notepad (preferably not a spiral, write-in-the-rain paper can be especially useful)
Amateur Radio Band Plan
GPS Device (this could be your phone)
Tablet or Small Laptop for digital communication (and power supplies for both)
USB flash drive

The Radio, Power Supply, and Tuner

Everyone has their own opinions when it comes to what brands you support and which manufacturers you are a fan of. Based on my recent experience in the field, I recommend the Elecraft KX3. I suggest the KX3 because it has an internal antenna tuner, and internal power source, and it is capable of VHF operations. However, choose whichever rig you are comfortable with; you are the one carrying it. Just remember whatever rig you carry will be in addition to whatever personal gear you may have. This includes carrying it through the airport.

My second choice would be the Yaesu 897. Other honorable mentions would be the Icom 703, Icom 706, Yaesu 817, Yaesu 857. It is also recommended that you install a bandpass filter in your transceiver. Transceivers working on multiple frequencies in your area could prevent you from communicating. If any of you have worked a busy field day you may have encountered this issue. If anyone has better suggestions for transceivers I am not aware of I would welcome your feedback.

No matter what radio you choose, it is best to try to compartmentalize it as much as possible. HF and VHF capabilities combined in one radio is better than carrying two radios. An internal tuner means one less device and a manual antenna tuner means one less power cord. An internal power supply means less cords and less draw on energy.

You should focus more on size and weight of the radio than the power output. For example, a large hurricane may cause damage to an area 100 miles wide and in that situation you might not need 100 watts to cover that distance; a lower powered radio would work just fine. Another advantage of a small radio is you often can power it with a laptop style power supply. It only needs 3 amps to run at 15 watts with 12 volts of current.

Another way of thinking of doing remote communications is to think of what you would bring for QRP on a hiking trip. I would not rely on less than 5 watts for emergency communication. But, if you are carrying your own gear to a small town with no power in another country think about how you would pack for that trip.

If you have a radio pre-installed in your go kit this would be great time to use it. It is a very smart and effective way to deploy communication equipment. You literally just need to open the case and throw up an antenna and you will be ready to communicate in minutes. If you need to move, you can have your radio packed back up just as quickly. Test all your devices and make sure everything works properly before you deploy.

The Antenna

HF Antenna

I have heard it stated many times that the antenna is more important than the radio. This is true. The antenna is key to your success in a disaster zone. You can pump 1500 watts into a bed spring but it will not be as efficient as 5 watts into a resonant dipole. At home I have a doublet, a 6 band vertical, and an end fed antenna. I will refrain from recommending one antenna type over another. There are about as many opinions as there are types of antennas.

Buddipoles are a nice concept for remote work on field day. But, in most cases that means a 50 foot walk away from your car. In practice they are more fragile and cumbersome than a plain old fashioned wire. Personally, I know of many people that have had a Buddipole break in the field. A strong gust of wind might be all it takes to ruin a good field day. If you are somewhere remote this same misfortune could jeopardize your mission.

For disaster situations, a tactical mag loop might work great. Once it is tuned, you typically do not have to adjust it much. Often times, you will park on one frequency and stay on it. There are good commercial versions available from companies such as LNR Precision, Alpha Antenna, or Chameleon Antenna.

Regardless of which antenna style you choose, I recommend an antenna that you are familiar and comfortable with that works on multiple bands. Your net control might only occupy one frequency, but you may still need additional bands for digital communications or to contact areas outside of your disaster zone.

VHF Antenna

For the VHF antenna I strongly recommend against anything that involves a metal telescopic portion. Those types of antennas tend to be very fragile. If someone throws their luggage on your antenna it will be ruined. A magnet mount antenna can be very useful in a variety of situations. You can use it for mobile operations while in route. You can attach it to the flashing of the roof at your base station.

One idea is to use a BNC or SMA magnet mount with a Signal Stick antenna (https://signalstuff.com/) attached to it. These antennas are virtually indestructible and take up very little space. A drawback to this antenna is that it may not be as efficient as a dedicated commercial mobile antenna.

Handheld Transceiver

Bring a handheld transceiver and, like all your other equipment, know how to use it. If you have two, bring them both. Just because you brought your radio doesn't mean other people in your team or group brought theirs. If you are traveling as a group in multiple vehicles, providing a radio to the vehicle in front of you will help if you are unexpectedly separated from the group, if mechanical issues arise, or if changes are made to the route. You may be set up on top of a mountain alone. It makes a lot of sense to be able to talk to the person in the valley below you. I don't know what circumstances you might encounter. In my deployment we arrived at a fire station that had lost all communication. We gave the two radios we were issued to the fire department. Luckily my partner and I both had brought our personal radios from home. You also should know about to program it.

You also have to remember that the normal methods of communication may be completely inoperable. Large portions of your day can easily be devoted to just looking for someone that you need to communicate with. Handheld Transceivers will save you a lot of time.

If you are without an independent mobile transceiver or base station you may consider bringing a coax adapter and mobile mount to run outside of your vehicle or base station. Your

handheld transceiver will work more effectively when it's signal is not blocked by concrete walls or the metal body of a vehicle.

When using handheld radios for backup or contingency communication make sure that everyone involved has a shared communication plan. If your volunteer organization has not provided you with a short-range or person-to-person communication plan you may need to come up with your own. A communication plan does not need to be complicated to be effective, a good plan can have as few as two frequencies and a schedule for when to use each one. Simple plans are easier to remember and easier to share when bringing a new person in. If possible avoid depending on a band's calling frequency. Calling frequencies can often be crowded and disorganized preventing effective communication.

Rope, Coax, Extension Cords

Your base station location may not be in an ideal area for radio communication. You are often limited to places that have some type of electricity. That might be a hospital, police station, or fire station. Even if you brought a generator you may not have adequate access to fuel. For this reason you are often dependent on outside resources. If you are at a hospital do all the floors have power? Does the parking lot of the fire station have trees or something tall to tie an antenna to? Did the storm knock down every tree for miles?

You will probably need more cord than you normally would expect. If your antenna is hanging over a light pole you will lose 40 feet of cord on each side just to reach the ground to tie it up. If the light poles are two hundred feet apart and you antenna is 135 feet long you just lost 55 more feet of cord. Your coax will need to reach your radio from your antenna location. Your radio still needs a power source. Those two things might not be in the same room.

You will also need any adapters that are required for the task. There is no store to pick up anything you forgot. Finding a barrel connector will be almost impossible. A good tip is to place barrel connectors on the coax and attach the ends. It will help keep the coax rolled up during travel. It will also prevent the coax connectors from being damaged during transport.

Practice using coaxial cable, learn to cut, strip, splice, and terminate coaxial cable. This should not be something that you do on your way to a disaster area. Find some scrap coax and practice making clean cuts in coax with the tools you will have with you. Poor quality cuts with

dull tools can make terminating coax very difficult and may require cutting again which wastes a limited resource. Stripping the insulation from coax may seem simple, but it is easy to cut through the metallic shield without realizing it. If you are able, practice stripping different types of coax (RG-6, RG-7, RG-8) until you are comfortable with each kind. You may only use one type of coax in your shack but in an emergency situation you may have to work with what you are given or what you can find. Splicing coax is not ideal for preserving good quality signals, but in the field you may not have much choice, learn to splice coax both with an adaptor and without. Practice making splices in the feedline of an antenna and test the performance with and without the splice to know what works and what does not. Most hams have experience terminating coax, but take the time to practice this skill while you are able. Practice your coax skills in a variety of conditions, in the dark, with wet and cold hands, somewhere you can reach but not see, around a corner. In a real emergency you never know when or where it will be necessary to work with coaxial cable. Even if you are unable to do something whether due to inexperience, disability, or other factors, at least you will know what you are capable of.

Other items

There are a lot of additional supplies you will want to bring on your deployment. There is no running home to pick it up an item you forgot.

Headphones are very helpful. If you are trying to copy a weak signal they are almost essential. You might be in the same room with 20 other people working on different task. You can't expect to tell everyone else to be quiet because you need to listen each time a message is delivered on the radio.

A sling shot may also be an effective tool. I know it might sound childish. It is honestly one of the best devices for launching an antenna. It is easier to pack and easier to aim than a fishing pole. I would like to think of myself as a healthy and athletic person. I still can't aim and throw a rock 50 feet up in the air with a rope attached to it. Now try to do that task over a 4 foot wide street light. It is almost impossible. Something to launch an antenna is often an overlooked item when working with emergency communications equipment. It really should be an essential part of your kit.

Some type of multi-tool is also helpful. You can use it to tighten connections or crimp wires. You may need a screwdriver for a variety of tasks. I used my pocketknife every single day while I was deployed. I didn't have a multi-tool. I had pliers, needle-nose pliers, a set of screwdrivers, and a

pocket knife. I could have had one device that would cover all of those areas . Instead I had 10 devices that took up space and added weight.

A writing utensil and notepad are also essential. You should always carry a pen with you. I would also recommend you keep a small notepad in your pocket at all times. You will need a larger notepad at your base station. I would refrain from a side bound spiral notebook. If you are are copying a lot of traffic or flipping through it much the cover will just fall off. A steno pad or a composition book is a lot more robust. You can even get a waterproof one if you would like.

GPS devices get cheaper everyday and are very important to life safety. Especially if you are alone. Someone needs to know where you are. Other members of your team may not be familiar with your area. They may not be be aware of geographic or man made landmarks to find your location. Your area might not even have a street address. Sharing your exact coordinates is an essential part of operations. If you are in danger, GPS coordinates to your location will be the best way to find you. You may also need it to share the locations of hazards, places to drop supplies, or denote areas where other tactical locations exist(emergency operation centers, shelters, working cell phone towers).

You can use a modern smartphone as a GPS. If you are going to use a smartphone as a GPS it is important to verify two things before you depend on it, the GPS capabilities of your phone, and if you can get coordinates. Make sure your phone has an actual GPS receiver built in, not all smartphones do. Some use cell tower and wifi based location only. You can usually check this in the phone's settings, so find a manual for your phone and find out for sure. Before you are deployed practice getting GPS coordinates from whatever app you are using. Some mapping apps make it difficult to find your own coordinates.. Before leaving home you should download an "offline" map of the area you will be working in. If you plan on using your smartphone as a GPS, look for apps designed for this, Google Maps is great for getting directions but apps designed for GPS often offer advanced features that you may want while deployed. If you are going to a foreign country get a translator app.

If you are bringing your smartphone make sure any app you plan to use will work offline, both Google Maps and Google Translate offer offline options, however be aware that Google Maps offline maps will expire after about 30 days. If you are traveling to a foreign country it would be wise to download a translator app.

If you are using any digital modes a computer or tablet of some sort is required. You won't be watching videos so it doesn't need to be large. You need to make sure any software you will use is downloaded and installed beforehand. You will also need any required drivers. Make sure everything works properly together before you go. Be prepared for more than one type of digital communication. PSK31, Winlink, APRS, and countless others will have their advantages

and disadvantages. It makes sense to be prepared for each type. I would recommend RMS Express, FLDIGI, and WSJT-X to be installed and ready to use.

A cheap multimeter is a valuable tool if you know how to use it. It will save you countless hours of frustration if you are trying to decide if a long wire is broke. You can also see if a if an electrical socket is properly grounded or verify the A/C voltage in your area.

Before you Land

Make sure you have your gear packed well. Put your hands on each item you place in your luggage. Write down what you have packed so you didn't forget anything. There will be no running home to pick up a missing item. If you forgot your soap there might not be another place to buy any for a while. While packing prepare yourself like you are backpacking to an exotic or remote location. You want to be as agile and prepared as possible.

Get the contact information of any available resources you may use. You should have a roster of all the individuals on your deployment. Make sure it includes the callsigns, phone numbers, and email addresses of your teammates. If you know the location of where teammates are deploying you should put that on the roster too.

Try to get a grasp of what your mission is. Be prepared for your mission to change often. One mission might change before it has started. You could be tasked to be net control before you arrive. When you get on the ground you might find that you are better suited to work at some remote clinic because back home you are a medical professional. It will be a lot easier for you to pass traffic if you understand what the client needs. Be flexible with your assignments.

You also need to know what leadership structure will be in place. Figure out your main point of contact. If you are supporting another organization or government entity learn who you are reporting too.

Something I found odd upon arrival on my deployment was there was no standard operating procedure for what we were doing. They said we were writing the book on this type of deployment. So much valuable time is wasted if you don't have an action plan already in place. Even small details like discussing what frequency we would use caused a debate. Everyone wants to share their opinion.

I like rules. I like knowing the steps to take and in what order. In the military I didn't have to think much. All the thinking was already done for me. I never had to write the book on CPR. The Red Cross and American Heart Association already wrote the book. I just needed to memorize the steps.

Try to make some standard operating procedures before you get there. This could be something developed and put in place long before you are called to a disaster. At the very least you need to know some basic things. What frequency will we operate on? What is our backup frequency? What mode of communications will we be using? What time will net control be on the air? Will we have a daily net to check everyone's status? What jobs will we perform? What are the descriptions of those jobs? Now put all those things on a sheet of paper inside your go kit.

Once you Arrive

Listen to the environment. Know your surroundings. Don't take everything at face value. If someone says you are in a dangerous neighborhood, evaluate what you are being told. I was in a town that was "dangerous". I asked how many murders they have per year there and they said "maybe one". My idea of dangerous might not be the same as someone else. Humans are almost universally good. If you ask for help you will often receive it. Most crimes are petty crimes of opportunity. If you have a Rolex leave it at home. Don't leave all your cash in your wallet for the world to see every time you pay for something.

If you are sent to a foreign country remember the culture that you are entering may be very different from the one that you just left. The traditions, manners, and taboos that you encounter will be different and may seem strange at first. Be aware of the stereotypes that you may believe about a place and get past them. Get to know the culture of the people you are working with, but don't put yourself in danger just to fit in; unfamiliar food, drink, and medicine can cause health issues and your hosts may unknowingly make you sick. Try to respect and recognize the culture you are in and you will be more likely to be accepted despite your differences.

Be prepared to hear a lot of random rumors and inaccurate news. Normal communication methods are broken. The "gossip train" has now just increased massively in size. I remember one morning my partner and I were listening to radio traffic when we heard another member of our team in a separate location ask about a fresh piece of news he was just told. He inquired if North Korea had just attacked the United States. What made the situation worse was Net Control wasn't sure either. We waited for a few minutes listening patiently as Net Control found out if the United States had been turned into a nuclear wasteland while we were deployed 2000 miles away. It was pretty humorous when it happened. For a second I felt relieved that I had made it out alive. As it turned out North Korea had not attacked us.

Don't be afraid to ask for directions while traveling. Just because map shows you the preferred route doesn't mean that it is still correct. The road might of been covered by a mudslide. Be prepared for obstacles in the road. Watch for non working traffic signals. You can't help anyone if you are injured before you arrive. Take notes along the way of any obstacles you encountered.

When you arrive at your final destination try to decide where you will need to set up your station. You might just be sent to a town with no specific location. You might be sent to an exact address. Find out exactly where you need to be. You want to find a location with reliable electricity if at all possible. You also need a place that can accommodate your gear, give you

shelter, and possibly a place to rest . If this can be in one location that is even better. If you feel that the place is not adequate don't be afraid to ask about other locations. Someone with no experience in Amateur radio will not be aware of what your specific requirements are. You can't expect someone to understand what a 40 meter dipole is. Their vision of radio communications might be a walkie talkie or a cb radio with a 6 foot long whip antenna.

You will also want to stay as close to your gear as much as possible. You would preferably want to sleep right next to your radio. You never know when emergency traffic will need to be sent. You want to make yourself easy to find. If you have to leave, check in with someone so you are always available to be reached.

Setting Up

I have always thought setting up my radio was the funnest experience in the hobby. I am more of a fan of Legos than Monopoly . It is time to have fun. If you were sent alone this is a great time to make friends. A person with little experience in radios might enjoy watching all this stuff get put together. Don't be afraid to let someone help you.

Working with Mains Electricity (line voltage)

Depending on the state of the electrical grid in the disaster area you may or may not have access to power from wall sockets. Before attempting to connect to an electrical source it is important to be aware of what you are plugging into, and have a basic knowledge of how electrical systems operate.

Different countries around the world use a wide variety of electrical systems with sometimes drastically different characteristics. Voltages around the world range from 100 volts in Japan to 240 volts in many countries around the world. Even if the plug on your device is compatible with the socket in a foreign country, there is no guarantee that the electricity coming from that socket won't destroy your radio. Even the adapters sold for travel should be used with caution. Even though the adapter may fit in a plug it may do nothing to make the voltage and line frequency compatible with your device. If you are deployed to another country your best source of information about electrical compatibility will probably be the volunteer organization that you are working with.

A radio amateur deployed to a disaster within the continental United States can be relatively sure that the electrical equipment in the disaster area is compatible with the equipment that they have brought with them. However it is important to note that in a disaster nothing is guaranteed. Damage to the electrical grid may have made it unreliable and subject to surges, brownouts, and outages. When possible your best sources of power are the ones that you bring with you: batteries, generators, and solar panels are usually reliable. Generators are great sources of long term power but can be subject to surges and spikes. A surge protector is helpful to protect your sensitive radio equipment when using a generator, alternatively use the generator to charge a battery and run your equipment from that battery.

When working in an emergency operations center (e.g. hospitals, police stations, fire stations, emergency shelters, etc.) it is good practice to get permission from someone in charge before plugging any equipment into any outlets. There may be amperage restrictions on certain outlets, locations where outlets are restricted to life saving equipment, or there may be only certain outlets that are powered by the generator. Whatever you do make sure that you get permission before *unplugging* anything even if its necessity is not apparent to you. When working with first responders it is not your job to determine if something is necessary or not.Get permission so that you do not inadvertently put lives in danger.

Mains electricity can kill you before you are even aware you are in danger. Take whatever steps are necessary to avoid coming in contact with mains electricity. Pay attention to where you walk and what you handle. Even if you have been working as an electrician for decades don't try to work on or repair the mains wiring in a disaster area, nothing in a disaster situation is predictable and something you have done every day for years at home could get you seriously injured or even killed. Avoid unnecessary risk—you are providing essential communication services and should you be injured or killed not only can you no longer provide those services but you have now added to the number of casualties in need to rescue.

Antenna Placement

If you are in a hurricane disaster site there might not be any trees around. Try to think outside the box when setting up your antenna. If you are in the downtown of some municipality your antenna might have to be stretched across a street between two tall buildings. When I was in San Juan I set up an antenna at the hospital. That meant hanging one side of the antenna from the edge a rooftop helicopter pad. The second end was hung across two streets and a courtyard to another building that was not affiliated with the local hospital.

You also need to be aware of who you are trying to contact. You don't want to null out Net Control. Antenna placement is an important aspect of radio communications.

Try to route your cables and radio out of the way of others. You are a guest in someone else's house. Act like one. Don't leave cut zip ties in the grass. Don't leave coax cable running across the hallway floor. You don't want to create a tripping hazard. The group providing you shelter might not be aware of what you are doing or how your equipment works. Just take a second and think about how annoying it would be if some foreigner came in you business and start flinging extension cords and cables all over the place.

As soon as you have everything installed test your setup. You should call net control on your predetermined frequency. If they don't answer just spin the dial until you hear someone and make sure the outside world can hear you too.

If you need help with something don't be afraid to ask. I needed a ladder for one task. I walked a mile to the local fire station to see if I could use one. They were extremely eager to help. Not only did they bring the ladder to me, they also helped me climb the cliff and to the top of a telephone pole to hang the antenna. You can always expect there to be help. You should still grateful for any assistance you receive.

Be resourceful. If you are missing an adapter, think about where you could find one. Are you close to an ocean? Marine VHF radios have the same UHF connectors as amateur radios. Are there any local emergency services? They use radios too. They might not be amateur radio operators but they probably still have coax at the dispatch center. Commercial radio stations might have useful supplies you could use too. There will probably be no amateur radio stores to pick up parts. You need to know where to find your resources.

When you are all set up

Now that you are set up, your work can really begin. The first thing you need to do is call net control. Inform net control of your exact location and status. This would be a great opportunity to give them gps coordinates and a street address for your station. Something could happen to your station at any moment and you might not be able to relay that information later. If your generator runs out of fuel it may be a while before the fuel is replenished.

You also should let net control know what obstacles you faced. Explain any limitations you might have. Ask for any additional resources you might need. There is a very good chance you are one of the first outsiders to arrive to your area. Give net control a clear and concise picture of what you encountered on your trip and at your present location.

You are also giving important information that other teams could use before they travel to your area. Maybe you had to take an alternative route because the road was closed. Being a good emergency radio operator also means being a good scout.

The second thing you need to do is let the public know you are there. You might be sent somewhere that wasn't expecting you help. No one will use your services if they are unaware of its availability. Meet the local community leaders. Find out what challenges they are facing. Develop contacts within the area and write them down. Learn the names and titles of the people you will be working with. Explain your capabilities and what service you are providing. Be very specific about what abilities you can perform. If you tell someone you can send emails they might think you are providing internet access.

While you are on mission

You are an Amateur Radio Operator doing emergency communications. You pass traffic. Keep it simple. You were sent for communications. Do it and do it well.

While you are at your station try to help out where you can. You always need to remember you are a guest. You might not be affiliated with the group you are supporting but you are still their ambassador. You are also an ambassador for the worldwide community of Amateur Radio.

This means you can help with chores around the house. Keep your work area clean. Keep your clothes put away in your bag. Keep your bedding folded on your cot. This will make

switching locations easier. A good goal is to be able to pack up everything for travel in 30 minutes. If your supplies are spread out too far to achieve this you may need to reevaluate how you deploy your equipment and personal items

In the morning don't be afraid to mop the floor or clean the bathrooms. You can cook dinner for the group. You can also help with unexpected emergencies that might arise.

I don't know many people who use amateur radio as a full time career. If you are a full time diesel mechanic back home and someone needs to replace a part on a generator you could might be the best person suited for the job. I am not suggesting you start freelancing. A little common sense goes a long way.

I used my outside experience and knowledge in more than one circumstance. I always asked permission before I attempted anything. One day I was cutting sutures for a doctor. The next I was bandaging a burn victim. I was there and it only felt natural to help. My advice is always act as a subordinate. The methods you use in your career back home may be different at your present location.

One thing I have found in foreign countries is a lot of people have one career path in life. It is not uncommon to find someone in the USA that was a real estate agent for a few years and then one day decides to become a nurse. You also find a lot of people that were mechanics, field scouts, medics, or engineers in the military. These career may not exist in civilian life. After their career in the military they may move to the corporate world. There are a lot of well rounded smart people in the amateur radio world. Use your talents to provide help where it is needed.

__Microphone Techniques__ (NCS MANUAL 3-3-1)

It is important to use prescribed microphone techniques when operating a radio. Most microphones used today are extremely sensitive and should be held or placed about one-half inch from your lips and spoken into at a normal level without raising your voice. The use of correct procedures shortens transmission time and releases the frequency to other users. Experience shows that the four most important factors in voice communications are the degree of loudness, rate of speech, pronunciation, and pattern of speech used. A brief summary of these factors follows:

LOUDNESS: The degree of loudness (volume) to use depends on a number of factors such as propagation quality, type of emission, and type of microphone being used. Speaking too loudly on a single sideband circuit may over modulate the signal to a point where it becomes unintelligible. As a general rule of thumb, speak clearly, distinctly, and in a normal tone.

RATE OF SPEECH: There is no fixed rate of speech that is best for all occasions. Generally, words are spoken at approximately 100 words per minute. If the message is to be written down, the transmission speed should be slowed accordingly. Speak at a rate which sounds natural, and allows the message to be written down by the receiving operator.

PRONUNCIATION: The third factor for good readability is the clear and distinct pronunciation of all sounds, syllables, and words. Words not pronounced distinctly may be misunderstood. Give all words a commonly accepted pronunciation.

PATTERN: Good readability in voice communications requires a not too fast, not too slow rate of speech and strict attention to pronunciation. A radio message should not be transmitted word-by-word. It should be transmitted idea by idea, with adequate spacing between the words that make up the separate ideas. To ensure understandability, radio transmissions should be similar to conversational speech.

Other considerations for voice traffic

When transmitting always call the station you are trying to reach with their call sign before you say your call sign. An example of this would be, "November Sierra Seven India. This is Kilo One November Zulu. Please standby to copy emergency traffic."

By using this technique it will help the person you are trying to call listen for the rest of the message. If you give your callsign first they may not be aware that you are trying to reach them. If you end your transmission with their callsign you will most likely have to repeat your traffic a second time so they are listening this time.

You also want to leave pauses in between long conversations. There may be someone else with emergency traffic that needs to communicate.

Things to do with your free time

You can expect to be very busy at times. Your first few days at an operation will often be the most challenging. Expect most of your time to be devoted to traveling and setting up communications. If things do settle down try to have some fun. This might be a 24 hour a day operation. Relaxing when you can will help you stay focused and more productive.

When you do get a free moment this would be a great time to DX or chat with others on your radio. Amateur radio operators will likely be quite entertained to hear about what you are experiencing. I had a lot of fun using FT8 and JT65 in the evenings. Depending on your location you might be able to communicate with areas that you could not easily contact from your ham shack back home.

Personal Items and Preparation

Packing your personal items is just as important as packing your radio. If you forgot your towel you might be drip drying for the next month. If you forget bug spray be prepared for a miserable experience.

I would pack clothing that dries quickly. I am not a fan of the feel of dry fit clothing. It would have been nice to have more quick drying items on my trip. You can rinse synthetic materials out in a sink and they are often dry by morning. I would pack a camping towel if you have one. They are more absorbent and dry a lot quicker than a typical towel. I once read in a very popular travel guide that a towel is the single most important item to pack for traveling. It can be used as a blanket, pillow, head scarf, or sweat rag.

Bring bug spray, sunscreen, a hat, bandana, personal first aid kit, water purification tablets or device, and all the rest of the things you would take camping. Look for a backpacking or camping packing list online for ideas of what to bring. You will also want to bring protein bars and non perishable snacks. Food might be in short supply. If there is no power that means no

restaurants either. I brought 20 protein bars with me and used them all.

I would highly advise you get some good Gore-Tex hiking boots. This is not something you want to buy at Walmart. You will also need some sort of rugged backpack. Again, I wouldn't trust something purchased at Walmart. It really needs to be tough. The weight of a MREs, water bottles, handheld radios, and notebooks will tear right through a cheap backpack. Look for something with a ton of pockets. You want to separate items so you don't have to empty your entire bag every time you need an something.

Do not bring a suitcase or a rolling carry-on bag to hold your luggage. For my trip I went to a local military surplus store and got an ALICE pack. It was large enough for all my my gear and toiletries. Roll your t-shirts and clothing. They will take up less space and it keeps them looking fresh when you pull them out.

Bring a 30 days supply of any prescriptions you take. Check the internet and see if there are any vaccines you will need for the area you are going. Make a visit to your doctor if you have time. Sometimes they will write you a prescription for antibiotics to take just in case you get sick. It would be a great time to find any medical problems you might have that you were not aware of.

Bring enough cash to support yourself for the length of time you are on your mission. If you are going somewhere with no phones or internet that also means no credit cards or ATMs. You might be going into an environment where resources were already stretched thin before disaster struck. If you are able to buy your own food then you should. It would be unfair to expect a poor community to take care of your needs when they do not have the resources to take care of their own.

What worked for me

Voice Communications

Voice communications always worked for me. If I couldn't raise net control I could still contact other members of my team who were listening. When you are at a large disaster site using one frequency there is a good chance a lot of the outside Amateur radio world are listening to your traffic. Use that to your advantage. Some person sitting in his ham shack 3000 miles away can be a hero.

My Equipment

Modern radio transceivers are very reliable machines. There are no fragile vacuum tubes that might break. I only had one item fail me and that was a coax cable. The Icom 7200 is a very well made piece of hardware. It is simple to operate. There were a few times I consulted the manual for menu settings when using digital communications. The built in sound card and usb cat control were also very easy to use.

Improvising and relying on my previous training

If you are an Amateur Radio Operator this meant at some time in your life you were tested. The test was meant to see if you had the knowledge and skill to use a radio. Try to remember the things you have been taught along the way. Each new skill becomes a tool you put in your toolbox. KB4ROR and I needed an antenna at one point that we didn't have with us. The repeater we were trying to reach was a considerable distance away. We went to the tallest building in our town. Our handhelds still were not able to connect to the repeater.

So we improvised. We literally put our basic knowledge of antennas together and were able to come up a very nice piece of equipment on the fly. I still get a kick out of the fact we built a 5 element tape measure yagi with about 30 dollars worth of equipment we got at the hardware store. The best part of it is the fact that it actually worked well.

What didn't work for me

Winlink

Winlink didn't work. Yes, it was possible to get messages out on Winlink. Yes, it was a valuable tool for transmitting messages. I also had zero issues using the provided software. The problem is you have to try multiple nodes to find one that can hear you. When you finally find the node that can hear you the band changes and your message stops getting transmitted. You have to start the process over again. It is not reliable form of communication and it should not be treated as such. I do not want to take anything away from the hard work the Winlink team accomplished. They provided excellent support to us. I think it should be a tool used in the future.

It can be a very simple way to deliver messages. You will know every single person on your team's email address. The email address is <callsign>@winlink.org. It can't get much simpler than that. It would have worked a lot better if we set up a local node.

If a team wants to use this in the future I highly suggest setting up a local node or using peer to peer for transmitting information via Winlink. It would probably work better in the continental United States where we have tons of nodes. It doesn't work as well in remote locations outside of the United States. Take a look at a list of all nodes next time you get a chance. I remember just a few in Mexico. There were none in the Caribbean. There are even fewer outside of North America.

Another issue is the location of Net Control and the location of the closest Winlink Node are not always going to be the same direction. Your antenna facing one might mean nulling out the other. You won't have a rotatable beam antenna in the field either. It is not going to be an

easy task to spin your wire antenna every time you want to try another node. The members of our team that had the most success with Winlink were using the internet.

Pertinent Traffic Not Getting Relayed

Your job as a Amateur radio operator is not to decide what you find relevant to pass forward. There is a reason radiograms have word "checks" is because literally every word is counted in insure the entire message is delivered.

There are only a few cases when you aren't allowed to relay traffic. You aren't allowed to use a radio for commercial purposes, to play music, or retransmit taped messages. This was all on the test for the Technician Class. You also are forbidden from using obscene language on the radio. The FCC makes it pretty clear what you can't say on the radio.

I had a major problem with someone not relaying patient information about an individual in critical condition. Let me very clear so everyone understands this. HIPAA DOES NOT APPLY TO AMATEUR RADIO. I hope we all understand this now. HIPAA applies to medical professionals and entities that receive compensation for medical services. The Department of Health has specifically addressed the rules of delivering patient information in a disaster or any other emergency situation.

Furthermore, agencies like the Red Cross are exempt from HIPAA. The Red Cross does not need consent to pass patient information. It is part of the charter with the United States government that they have unique ability to relay patient information without even asking permission.

Even if you were working for a HIPAA compliant agency all you need to forward information is the patient's consent. This does not need to be written consent. Verbal consent also works for these circumstances. If the patient is unconscious you do not need verbal consent. There is a term in the medical world called "implied consent". Implied consent is consent based on what a reasonable person would decide if they had the ability to speak on their behalf.

What information can you pass forward? *The patient's name, condition, and location.*

How can you pass this information? *By any means necessary. You can use the police, the media, or even via Amateur radio.* You can also use these methods to find out who the family members are if you do not have that information.

Who can you notify about the patient? *Family members or other pertinent people who should have this information.* The United States Department of Health is pretty clear about this. It does not need to be an immediate family member. You should use common sense with this. The purpose of sharing patient information is for reunification of patients and their loved ones.

Receiving feedback from Net Control and knowing when resources were being dispatched to your area

Any time net control gets new information on a previous request they should forward that information back to the radio operator who requested it. The local community wants feedback

on their request. They want to know if their messages are being received. Communication goes two ways.

If resources are being dispatched to your area it would be helpful if you knew. This information could be disseminated to your local area so they can be prepared for the arrival of additional personnel and supplies.

Amateur Radio Operators abandoning their responsibilities

Another aspect I want to strongly focus on is Amateur Radio Operators abandoning their task. If you were sent to a disaster to work as a volunteer Amateur Radio Operator please stick to that. Don't decide arbitrarily to become some government official and coordinate relief efforts. Don't make this job harder than it needs to be. Let the organizational leadership coordinate relief efforts. If you wanted to run the relief effort or disaster operations you should have volunteered for that task. No one forced you to volunteer as a radio operator.

You also shouldn't leave the agency you volunteered to help to coordinate with another agency. You job is support the agency you volunteered for. FEMA does not take volunteers. FEMA coordinates with agencies that have volunteers. If you want to work for FEMA then send them your resume.

Sending Radio Operators out alone

You do not need to have two Amateur radio operators at every location. But, at the very least you should have all deployed teams go out in pairs. If one person isn't a radio operator they can still provide vital assistance. They could assist in copying traffic. You can reciprocate their help by assisting them with their task. Your partner may need to speak to their leader back at headquarters for clarification on a confusing task. You can legally allow them to talk directly to that person while you sit next to them. You can also take turns monitoring traffic. You don't need to be a licensed ham to listen to the radio.

Not having the best gear for the task

No one knows exactly what you will need until you encounter a situation first hand. We were told not to bring our personal equipment. I can understand the logic of telling someone to leave their gear at home. There might be unique communication methods that you will provide that require specific equipment. If you bring your own equipment and it gets damaged you will be the one losing that money. You also do not want to carry more gear than you have to. The exception I take with this is you might be using equipment you are not be familiar with.

I know on our deployment we had the best equipment we could get for what we thought our mission was going to be. It was also the best equipment that could get put together in such a short amount of time. It doesn't mean we can't try harder in the future.

I would always recommend bringing your personal handheld radio. A handheld transceivers takes up little space. Handheld transceivers are also some of the most confusing pieces of equipment to try to manually program. Each radio is different.   If I knew what

methods of communication we were using I would have brought my own HF equipment from home.

Whackers

      First. Let me define this term for those unaware of its meaning.(sourced from rationalwiki.org)

      The term is common in volunteer firefighting for those who join the fire department mainly as an excuse to show off to the world that they are bad-ass firefighters but with little to no interest in doing the work involved, among police for those who think their involvement in something peripheral to police work such as being a mall security guard or a junior explorer makes them a bona fide cop and god's gift to law enforcement, and in ham radio to poke fun at the small number of hams who always seem to mysteriously show up at public emergencies decked out in an expensive array of tactical radio gear, police boots, and an orange vest, to "offer their services" and get in the way. Ham radio whackers mistakenly think their ham license makes them real honest to goodness "first responders".
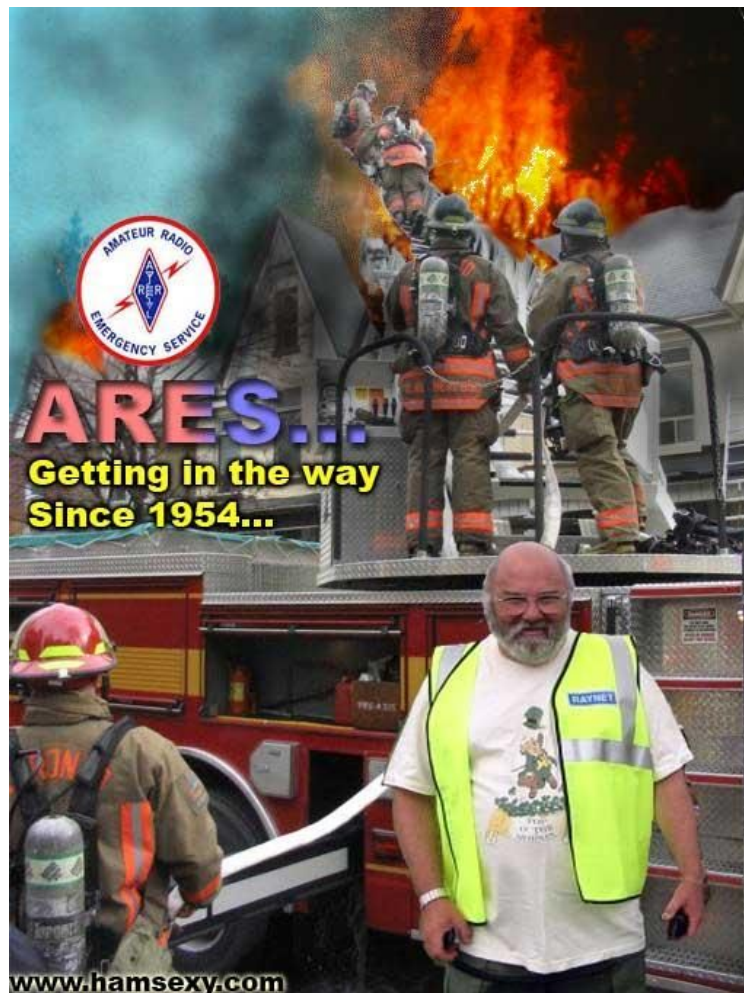
You weren't sent to be a leader. You were sent to be a worker. If you take on a leadership role you will begin to abandon your role of delivering communications. If you are assigned to support a group then let them be the leader. Don't represent yourself as something you are not. If you were sent to help a charitable organization don't go around wearing a FEMA t-shirt to get access to meetings you don't need to be involved with. If you were sent to help FEMA with communications don't invite yourself to the board meetings for operations.

You will do more harm to the mission if you freelance and try to take on a leadership role. There will be more than enough people jockeying for authority. When you have 100 leaders you get 100 voices with 100 opinions. The information becomes gridlocked and nothing positive can become accomplished.

If you decide to freelance you also just hurt your team by taking one more person out of the field. In the United States there are about four Extra Class Amateur Radio Operators for every 10,000 people. You are a very valuable and rare resource. You don't need to be the Public Information Officer. You don't need to be FEMA coordinator. You need to be a first class Amateur Radio Operator.

These type of events brings out all sorts of people. You will often find people that exaggerate their careers back home to get some type of higher level of access or authority during disaster operations. If you worked as a security dispatcher at the community college back home that does not mean you have 15 years experience as a law enforcement professional. If you work for a private government contractor back home don't go around telling people you work for the Pentagon as if you have some greater understanding of military logistics and operations. You sure as heck shouldn't be wearing clothing that gives the illusion you work for FEMA or some other government agency. You might laugh now but I am citing scenarios that actually took place.

I had never met any of the people I worked with before we were deployed. I was not sure of what skills they brought to the table. The only thing I could do at the time was trust their opinions and advice. Don't erode this trust by being caught in a lie.

If you are a whacker you might need to remember you don't know who you are telling tall tales too. If you say you were an interrogator in the military you might actually be talking to someone who was a 97 Echo (Human Intelligence Collector/Linguist) in the US Army. If you say you are a member of law enforcement or dress as if you are a FEMA agent you might be walking a narrow path to getting yourself thrown in jail.

You also need to remember your outside career may have little in common with regards to the present situation you now face. You may have a doctorate in Spanish literature but that has very little to do with emergency radio communications via amateur radio. Do not let your career title or authority back home confuse you about what your present mission or role is.

Don't be a hero. There is a reason that your ham radio go box didn't come with a cape. I am sure if you seek out a reporter you can get yourself in the news. Don't waste your time trying to be famous. If you do your job correctly and are being helpful the media will come looking for you. That is a fact.

Net Control Suggestions

Net Control may require more radio operators than remote stations. Net control should be operational 24 hours a day if you have radio operators dispatched out in the field. You may need multiple operators to fulfill that task. If you are rotating shifts always give a face to face update of what events happened during your previous shift. Remote stations may not be aware of what operator at net control took their information. All net control operators need to be on the same page. It would be smart to have a logbook to review of what communication were relayed along with the time and callsign of the person who sent it.

Net control might require multiple transceivers. You will need at least one independent VHF transceiver if you are using that form of communication. If you have teams west of you and teams east of you using different repeaters you will need additional VHF equipment to talk with both. You might even need a third VHF radio for simplex. If you are using digital communications you should have a HF rig dedicated for that purpose. If at all possible net control should be located in an area with extremely reliable electricity. It will also be helpful if the area has reliable telephone and internet capabilities. Net control does not need to be in the epicenter of the disaster. It needs to be in a place that it can effectively coordinate traffic and relay information to for disaster operations.

Another consideration for net control is to not rely on one form of communications to get out vital messages. If you send out important status updates via digital modes you may not be aware of limitations deployed units in the field face for getting this information. There may be key pieces of information that are never received. This brings me to my next point.

Scheduling mandatory daily nets to pass information would be highly recommended. This could be more frequently if the mission requires and allows it. It is about the only way to insure everyone is on the same page. Plus, you can get instant feedback on tactical decisions and assignments. Communication is a two way street. You cannot expect deployed assets to follow commands when you are not aware of their present status or obligations.

Use Local Hams for Help

The FCC has one rule for licensing that you can use to your advantage. All Amateur Radio Operators are required by law to give a good mailing address so they can be located. You can find the address of most radio operators on QRZ.com or by just googling a callsign. QRZ has a search method where you can search by address. I used this same method to find help in two different locations outside of the United States. I literally just walked right up to their door and asked if they could help. They were eager to give their assistance. One ham even let me borrow a mobile VHF rig that I used at our station for the duration of our trip.

Using WSJT to Test Propagation

Another tool I used was WSJT. It is a good way to see who you can hear. It even has a handy tool showing signal strength of incoming communication. If you are familiar with callsigns you

can see what locations are transmitting well. You can also use the same program to switch between the bands and see what is bands are working well at different times of day. Even if you do not have a laptop you can still tune to those popular frequencies and see if anyone is transmitting on them. This isn't a foolproof method but it can be helpful in a pinch.

Teach the Locals about Amateur Radio

Try to teach about Amateur Radio to who ever listens. Bring a digital version of the Technician and General Class Study Guide you can share. There are free versions available online. If you are deployed to a disaster zone then there is a good chance the local community didn't have a reliable way to communicate. You need to be an ambassador for the sport. Not only are you encouraging more people to join the hobby; you are also creating self supportive communities that can better prepare themselves for disasters.

One community I went to had a mint condition Icom 706 Mark II with the matching tuner and power supply. Not one person in the entire town knew how to even turn it on. I thought it was a pretty wasteful expense of the government to install such a powerful tool and not teach anyone how to operate it. This community had zero contact with the outside world for multiple days after a storm had devastated their area. Yet not one person realized they had a reliable tool for communication at their fingertips.

Getting your Technician Class and General Class license really doesn't take a lot of effort. You can pass both test with a few days of reading and studying. I took a Boy Scouts patrol of 6 Scouts and 2 adult leaders to a Amateur Radio Technician class here in my hometown. The class consisted of one full Saturday and half of the next Saturday. We only had one Scout not pass the test. We had 1 adult leader pass the General Class exam. This is with zero past history in radios. The oldest scout was only 13.

When teaching use the EDGE method. This means to educate, demonstrate, guide, and enable. It is a tried and true method to teach a new skill. Let your students put their hand on the radio and practice using the controls.

If you have an opportunity to teach your skills to someone else you should take it. You are literally making the community you are deployed to safer and you are promoting a great hobby.

Let Outside Radio Operators Help You

If you are at a major disaster site conducting all your traffic on a single frequency the outside world is going to take notice. Amateur Radio Operators are a curious bunch. You can use this to your advantage. You might need help with a technical question. You might be one of those "no code" Extras who can't decipher emergency traffic. Someone could be calling for help in a foreign language you don't understand. Just because you are conducting emergency operations doesn't mean you own the airways. If someone is offering help to, take them up on their offer.

Likewise, if someone outside of your emergency area is interrupting traffic kindly ask them to stop. Be polite. You always get more bees with honey.

If You are the Outsider

If you are not actively involved in emergency communications you can still be of assistance. Take notes of the traffic that is being passed. This might be a great learning experience for you. If you are familiar with the amatuer radio bands you know that sometimes you might not be able to hear the person 50 miles away but you can clearly hear someone 1000 miles away. You might be able to fulfil a vital role in relaying traffic.

While I was on deployment someone not involved with our deployment provided assistance. I interrupted a net to relay urgent traffic. A radio operator (KC7FPF) who was 2000 miles away heard me call "break" during their traffic. KC7FPF was able to notify the family via his telephone of their family member's condition and location. Without his assistance it might of been days before they found out their loved one was in distress.

There was also more than one time when I called for net control and I got silence. It gave me a lot of comfort when I knew someone could still hear my calls. It also let me know I wasn't having an equipment problem.

The only annoyance I had with outsiders was when someone would tune up their antenna right on top of the frequency we were using. You should never do that. You should also always take a few seconds and listen to make sure no one is talking on the radio before you transmit. This is a common courtesy we should all share. We had the same problem within our own team. I can think of at least one circumstance when someone was transmitting emergency traffic via CW when someone in our group hopped on the radio and started yacking. It is quite embarrassing when you interrupt emergency communications because you weren't practicing good radio etiquette.

This isn't Field Day

You won't be taking your RV out to a remote location. This is not field day. Remote emergency communications isn't the time to be wearing flip flops and grilling hot dogs at your local park. You won't be laying in your zero gravity chair drinking Mimosas. Remember this when preparing for your deployment.

One key difference between a real emergency and field day is your uniform. It will make a lot more sense to wear your job title or the organization you represent on your hat or uniform. Your callsign with have little meaning to any outsider with whom you come in contact with. The general public might not understand what "WØNY" means. More people will easily comprehend "Emergency Communications" or "Salvation Army Disaster Relief".

I personally never wore a uniform. I had an ID card I wore at all times. I wasn't directing traffic in the dark so I had no need for a orange reflective vest. Another thing I considered was that I was working alone in a foreign community. I didn't want to attract any unnecessary attention to myself.

Things I would have liked to tried

If there was one thing that I would have loved to try, it would have been other forms of digital communication. I know APRS has methods of sending email. I am also aware that these messages need to be short. One advantage I find with this mode of communication is you only use one frequency. Instead of changing frequencies every time you try a different gateway you can just send out you message on one frequency and see who hears you. If FT8 can decode 20 different signals in one area of bandwidth I do not understand why we couldn't have an email format that could accomplish the same task. Once the message is sent it should be held in queue until the receiver is able to download it.

If there is some method of communication software that performs in this manner I am not aware of I would love to learn more about it.

Thanks for taking the time time read my guide. It is a work in progress. If you have any suggestions please forward them to kc_exactly@yahoo.com for consideration. If you suggest any edits that I use in this document please email your name and callsign so I can thank you for your contribution. I want to give credit to anyone who assisted me. If you gave assistance and you are not acknowledged please let me know.

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